

# REVISIONS

SYMBOL	PREP BY	DESCRIPTION	DATE	APPROVAL
A	JPL	1. Added welding rejection criteria (paragraph 4.2 (h)) 2. Added vibration and test method to screening regimen (paragraph 3.15 and 4.10) and (4.1)	3/28/85	<i>[Signature]</i>
B	JPL	This specification is cancelled; no replacement.	10/8/85	<i>[Signature]</i>

CANCELLED

PREPARED BY John P. Lawrence	DATE 10/12/84	TITLE
APPROVED George P. Kramer, Jr.	10/16/84	Procurement Specification for a Three Phase Motor Protector Thermostatic Switch.
APPROVED		
APPROVED		
		# S-311-367B



Branch - Parts  
Division -  
Project -

GODDARD SPACE FLIGHT CENTER  
GREENBELT, MARYLAND

## 1.0 SCOPE

This specification covers the procurement requirements for a three phase motor overload protector, bimetallic, hermetically sealed, snap action, thermostatic switch.

## 2.0 APPLICABLE DOCUMENTS

The following documents, of the issue in effect on date of invitation for bids form a part of this specification to the extent specified herein.

### Specifications

MIL-S-24236 Switches, Thermostatic (Metallic and Bimetallic), General Specification for

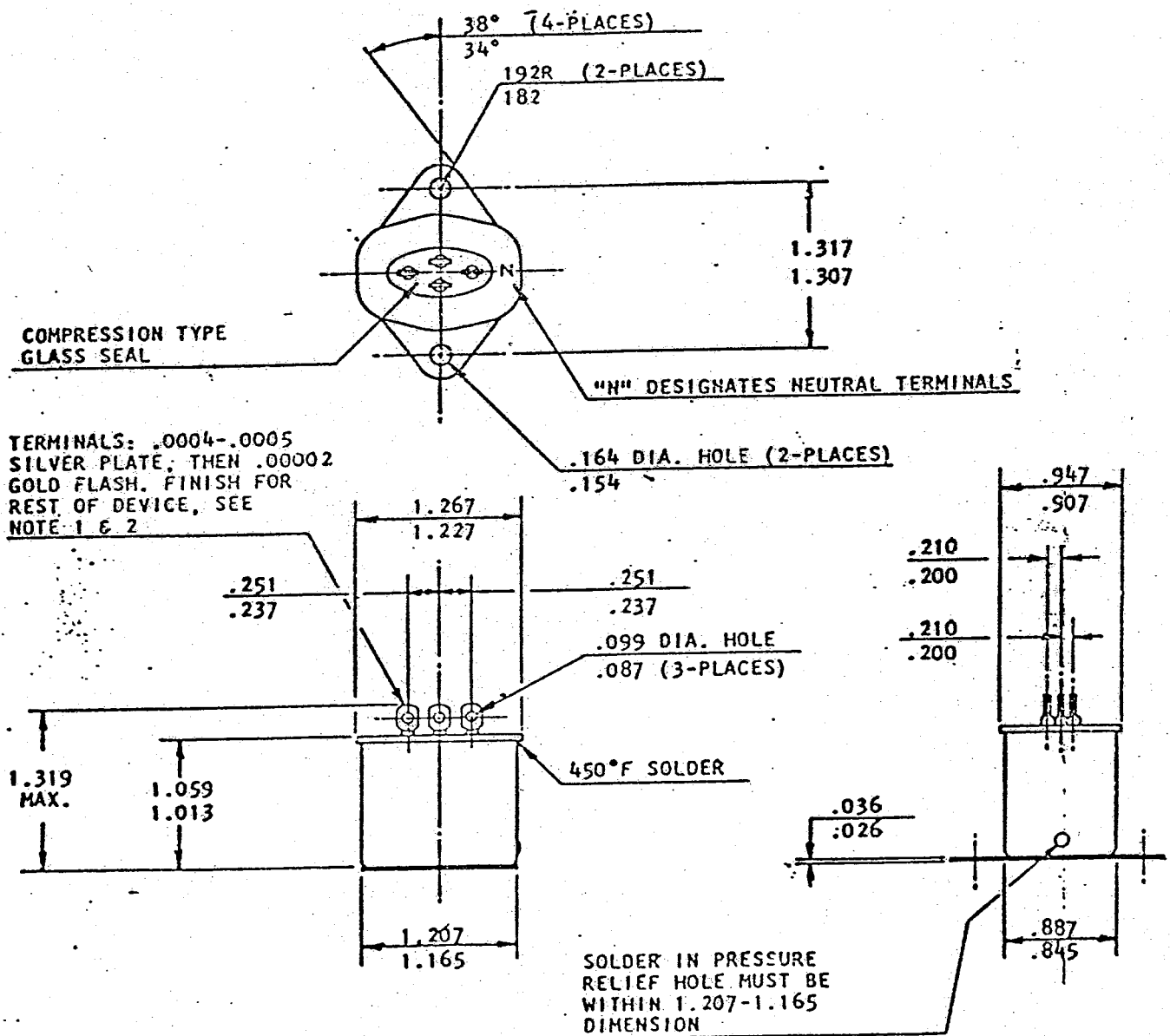


Figure 1. Switch

### 3.0 REQUIREMENTS

3.1 Design and Construction. Switches supplied to this specification shall be of the design, construction and physical dimensions delineated herein. Figure 1 depicts the switch configuration.

3.1.1 Workmanship. Thermostats shall be processed in such a manner as to be uniform in quality and shall be free from cracked or displaced parts, sharp edges, burrs, and other defects which will affect life, serviceability or appearance.

3.2 Temperature Setting. The switch shall open on increasing temperature at the values listed in Table 1.

Table 1. Part Numbers, Operating Temperature and Trip Currents

PART NO.	OPERATING TEMPERATURES °C		AMPERES* 1	FIRST CYCLE TRIP 2	
	TRIP	RESET		AMPERES 2	TIME IN SEC
9644-001-001	175±8	-71±15		9.8	10-21
9644-001-002			9.35	22.0	4-10
9644-001-003				30.0	4-10
9644-001-004				13.25	6 1/2-16
9644-001-005			2.82		
9644-001-006			9.50		
9644-001-007			3.82		
9644-001-008	150±7	102±15	1.80	6.2	6 1/2-16
9644-001-009	200±10	130±15	3.50	12.25	6 1/2-16
9644-001-010		-71±15			
9644-001-011	120±8	78±15	.45	1.9	6 1/2-16
9644-001-012	200±10	130±15		24.0	2-12
9644-001-013	150±7	102±15	5.0	18.0	2-14
9644-001-014	150±7	102±15	.92	3.1	6 1/2-16
9644-001-015	200±10	130±15		22.0	6 1/2-16
9644-001-016	175±3	116±15		8.7	6-16
9644-001-017	175±8	116±15		5.1	6 1/2-16

\*THESE VALUES ARE CALCULATED AND LISTED ONLY TO SHOW RELATIONSHIP BETWEEN RATINGS.

1. ULTIMATE TRIP CURRENT IN AMPERES AT EFFECTIVE PROTECTOR AMBIENT OF 100°C.
2. FIRST CYCLE TRIP CURRENT IN AMPERES THAT WILL TRIP DEVICE IN TIME SPAN SPECIFIED AT EFFECTIVE PROTECTOR AMBIENT OF 25°C.

- 3.3 Inspection and Testing--All thermostats shall be screened on a 100 percent basis in accordance with 4.1.
- 3.4 Part Number--The manufacturer shall establish a unique part number which reflects all the requirements of this specification.
- 3.5 Date Code Identification--Each thermostat shall be identified by a date code that shows the year and the week of manufacture.
- 3.6 Part Marking--Each thermostat shall be marked with the part number and date code established under 3.4 and 3.5.
- 3.7 Approved Manufacturers--Procurements to this specification shall be limited to the manufacturers listed in paragraph 6.0.
- 3.8 Pre-cap Visual--Pre-cap visual shall be performed in accordance with 4.2.
- 3.9 Run-in Cycling--Run-in cycling shall be performed per 4.3 to verify proper switch function.
- 3.10 Calibration--When thermostats are tested as specified in 4.4 the operating points for the opening and closing temperature shall be within the tolerance specified. (See 3.2.)
- 3.11 Creepage--When thermostats are tested as specified in 4.5, the opening and closing of contacts shall occur simultaneously with and as a result of the disc snap.
- 3.12 Seal--When thermostats are tested as specified in 4.6 the leakage rate shall not exceed  $1 \times 10^{-8}$  standard atmospheric cubic centimeters per second (atm cc/sec).
- 3.13 Dielectric Withstanding Voltage--When thermostats are tested as specified in 4.7, there shall be no flashover, arcing or current flow in excess of 500 microamps.
- 3.14 Contact Resistance--When measured as specified in 4.8, the contact resistance shall not exceed 20 milliohms.
- 3.15 Sinusoidal Vibration--When thermostats are tested as specified in 4.10, opening of closed contacts shall not exceed 10 microseconds. There shall be no mechanical damage and devices shall successfully pass the remaining screening tests.

#### 4.0 QUALITY ASSURANCE

4.1 Screening--All thermostats shall be subjected to the screening tests and inspection per Table 2, in the order shown. Thermostats not meeting all screening requirements shall be rejected.

Table 2. Screening

Test or Inspection	Requirement Paragraph	Test Method Paragraph
Pre-cap visual	3.8	4.2
Vibration	3.15	4.10
Run-in Cycling	3.9	4.3
Calibration	3.10	4.4
Creepage	3.11	4.5
Seal	3.12	4.6
Dielectric Withstanding Voltage	3.13	4.7
Contact Resistance	3.14	4.8
Visual Examination	3.1 & 3.6	4.9

4.2 Pre-Cap Visual--Pre-cap visual inspection shall be performed with 10X magnification and bright light. Immediately, prior to enclosing the parts in case, the assembly shall be thoroughly examined for design, cleanliness and good workmanship. Parts shall be rejected if any of the following defects are found:

- a. Cracks in glass,
- b. Foreign materials,
- c. Burrs along edges,
- d. Angular or dimensional misalignment of interacting parts greater than drawing allowable tolerances,
- e. Blistering or flaking of plating,
- f. Transfer pins or insulators which have sharp peaks, cracks or plating,
- g. Loose material or particles greater than 25 microns.
- h. Welds
  - 1.) Damaged or degraded welds resulting from trimming or cutting of excess part leads or interconnecting material.
  - 2.) Cracked, fractured, distorted, or broken welds.
  - 3.) Loose or stringy weld splatter or flash.
  - 4.) Holes or voids.
  - 5.) Any weld that exhibits excessive metal expulsion. This includes excessive splattering of material expelled from the weld zone and excessive bulging of material at the weld interface as a result of plastic deformation.
  - 6.) Off-center welds.

4.3 Run-in Cycling--An operating run-in of 500 cycles at a load of 100 milliamperes and 6 Vdc shall be performed. Monitoring and failure criteria shall be at the manufacturers option. However, all switches shall be capable of meeting all subsequent screening tests and examinations.

4.4 Calibration--Thermostats shall be tested as specified in MIL-S-24236.

4.5 Creepage--Thermostats shall be tested as specified in MIL-S-24236.

4.6 Seal--Thermostats shall be tested as specified in MIL-S-24236, for hermetic devices.

4.7 Dielectric Withstanding Voltage--Thermostats shall be tested in accordance with MIL-S-24236; sea level condition only.

4.8 Contact Resistance--Thermostats shall be tested in accordance with the provisions of MIL-S-24236.

4.9 Visual Examination--Thermostats shall be examined to determine that the design and construction, workmanship and markings are in accordance with the applicable requirements.

4.10 Sinusoidal Vibration--Thermostats shall be tested in accordance with MIL-STD-202, Method 204, test condition D. The entire frequency range of 10 to 2000 Hz and return to 10 Hz shall be transferred in 10-20 minutes. This cycle shall be performed 2 times in each of three mutually perpendicular directions (total of 6 times). Contacts shall be monitored. All contacts exhibiting chatter exceeding 10 microseconds shall be considered failures.

## 5.0 PREPARATION FOR DELIVERY

5.1 Preparation for Delivery--the manufacturer shall be responsible for packaging and packing thermostats in a manner which prevents degradation, corrosion, deterioration or physical damage, and for ensuring the packages have a safe delivery and are in good condition.

5.2 Data--As a minimum, summary screening inspection and test data shall be shipped with each thermostat lot.

## 6.0 NOTES

6.1 Approved Manufacturers--Texas Instruments, Control Products Division, Attleboro, Massachusetts, 02703.

6.2 Part Number Similarity--The parts supplied to the requirements of this specification are similar to those supplied by the source in 6.1, under part numbers delineated in Table 1, except for the added screening requirements (see 4.1).

Custodian:

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